WORKING PAPER

Working Paper No. 90

DETERMINANTS OF RURAL NON-AGRICU EMPLOYMENT

by

D. Jeyaraj

MADRAS INSTITUTE OF DEVELOPMENT STUDIES
79, SECOND MAIN ROAD, GANDHI NAGAR, ADYAR
MADRAS 600 020

Working Paper No. 90

DETERMINANTS OF RURAL NON-AGRICULTURAL EMPLOYMENT

by

D. Jeyaraj

Madras Institute of Development Studies
79, Second Main Road, Gandhinagar
Adyar, Madras 600 020

June 1989

DETERMINANTS OF RURAL NON-AGRICULTURAL EMPLOYMENT

INTRODUCTION

In a recent article Vaidyanathan (1986) has analysed the labour use pattern in rural India, in which he has identified that there exists large variation in the distribution of workforce in rural non-farm sector across states. In examining the distribution of workforce, he has listed several factors such as urbanisation, development of transport, commercialisation of agriculture etc. as factors causing the variation in the distribution of workforce in rural non-farm sector. From his work it is deduced that the factors responsible for the growth of rural non-farm sector can be grouped broadly in to two sets namely (1) external and (2) internal.

Urbanisation is thought to be the most important factor external to the rural economy that affects the growth of rural non-farm sector in two ways. Urbanisation requires the services of rural artisans, semi skilled and illiterate workers to work in the growing urban manufacturing and services sector on the one hand and on the other, it creates the demand for manufactured consumer goods and semi finished raw materials of rural origin. Demand for labour services does not result in spurt in rural non-farm activities while the demand for products results in spurt in non-farm activities in the rural hinterland .

Absorption of labour force in the urban non-farm sectors

have two types of impact namely (1) pull and (2) push effects . Occurance of these two types of effects depends on the stage of growth of an urban centre and development of transport system. In the initial stages of urban growth labourers who get employed in the urban centre will migrate into the urban area due to better facilities available in the urban centres. Thus in the initial stages, migration will reduce the percentage of workforce in non-agricultural pursuits in the rural hinterland, which is referred to as pull effect. In the later stage of urban growth due to congestion and the resultant bad living conditions workers who are absorbed in the urban manufacturing and service sectors may prefer to reside in the rural area or in the urban periphery and commute to the work spot. Apart from bad living condition, the growth of transportation which makes commutation easier accentuates the process. This later effect is referred to as push effect. Thus push effect results in higher percentage of workforce in non-agricultural activities in the rural area.

Urban growth results in spurt in non-farm activities in the rural hinterland through its demand for manufactured consumer goods and semi-finished raw materials of rural origin. Further auxiliary industries grow in the nearby rural areas that support the growth of main industries in the urban centre. The spurt in non-farm activities in the rural hinterland depends on the size and economy of the urban centre. Expansion of •rural non-farm sector results in the growth of non-agricultural employment in the rural areas themselves.

Growth of agricultural output, distribution of income in the rural area, degree of commercialisation of agriculture and rate of unemployment in the rural area are the important factors internal to the rural economy that affect the growth of non-farm sector in the rural area. Growth of agricultural output on the one hand requires purchased inputs such as fertilizer, pesticides etc and on the other hand has to be marketed efficiently . Purchased inputs have to be delivered at the farm gate, which stimulates the growth of non-agricultural employment. Marketing of increased output requires expansion of trading activities resulting in the growth of rural non-farm sector. Equitable distribution of income may have negative impact on the growth of non-agricultural activities as it is expected to increase the demand for food products rather than the manufactured consumer goods. The extent of commercialisation of agriculture determines the extent of trading and transportation activities in the rural area and thus is expected to have positive impact on non-agricultural employment. Rate of unemployment which is the reflection of poor labour absorption capacity of agriculture is taken as a measure of people resorting to non-agricultural employment. It has been argued (Vaidyanathan (1986)) that rural service sector acts as a sponge or residual sector that absorbs the labour force that could not get employed in agriculture. Thus the rate of unemployment in other words reflects the pressure on land which results in the growth of rural non-farm sector. Given these reasoning this paper attempts at evaluating the factors that determines the growth of rural non-farm sector both at district and taluk levels of Tamilnadu. Throughout the

paper workforce refers to only male workers in the rural area.

Distribution of workforce:

Census data[1] for the years 1961, 1971, and 1981 are used in the analysis. At the state level (Table No.1) it is observed that there has been sharp decline in percentages of male workers engaged, as cultivators, in household industries, in other services and in forestry plantation etc. while percentage of workers in construction remains almost constant between the three censuses. Further it is observed that share of workers engaged in agriculture as labourers, manufacturing, trade and commerce and transport and storage has gone up consistently between census. Increase in share of agri- cultural labourers seems to be a fallacy[2], which is confirmed by a deep look at the definition and criteria adopted for identifying main activity of workers. It is understood that for the first time in Indian censuses, time criteria has been adopted in 1971 for classifying workers according to their main activity. Adoption of time criteria (ie) number of days engaged in a particular activity might have resulted in classifying a group of workers hitherto (ie in 1961) classified as cultivators or engaged in other services as agricultural labourers.

---

1. Source of data and the problems are discussed in the appendix.
2. Even after adjustment the increase in percentage of workforce working as agricultural labourer seems to be high. It has to be pointed out in this connection that we have not attempted at correcting for the impact of change in the definition of workforce on cultivators.

Table No.1

Distribution of Rural Male Workers

(Tamil Nadu)

Occupation	1961	1971	1981
Cultivators	53.14	45.64	43.82 (43.51)
Agricultural Labourers	17.75	30.91	30.95 (31.32)
Sub-Total	70.89	76.55	74.77 (74.83)
Livestock, Forestry, Fishing, Mining and Quarrying	3.13	2.94	2.78 (2.79)
Construction	1.13	1.09	1.09 (1.08)
Sub-total	4.26	4.03	3.87
Household Industry	6.16	3.52	3.54 (3.54)
Manufacturing other than Household Industry	3.02	4.63	6.01 (5.98)
Sub-total	9.18	8.15	9.55
Transport and Storage	0.67	1.04	1.62 (1.61)
Trade and Commerce	2.92	3.91	4.91 (4.92)
Sub-total	3.59	4.95	6.53
Other Services	12.08	6.31	5.28 (5.24)

(1) Figures in parantheses are worked out including marginal workers.

Table No.2
Distribution of Rural Male Workers
(Tamilnadu)

Occupation	1961	1971	1981
Cultivators	53.14	45.64	43.82 * (43.51)
Agricultural Labourers	23.52	30.91	30.95 (31.32)
Sub-total	76.66	76.55	74.77 (74.83)
Livestock, Forestry Fishing, Mining and Quarrying etc.	3.74	2.94	2.78 (2.79)
Construction	1.13	1.09	1.09 (1.08)
Sub-total	4.87	4.03	3.87 (3.87)
Household Industry	5.55	3.52	3.54 (3.54)
Manufacturing other than Household Industry	3.02	4.63	6.01 (5.98)
Sub-total	8.57	8.15	9.55 (9.52)
Transport and Storage	0.67	1.04	1.62 (1.61)
Trade and Commerce	2.92	3.91	4.91 (4.92)
Sub-total	3.59	4.95	6.53 (6.53)
Other services	6.31	6.31	5.28 (5.24)

* After correcting for definitional changes
Figures in parantheses are worked out including marginal workers.

A closer look at the data at taluk level between 1961 and 1971 reveals that the decline is more pronounced for taluks of industrialised districts such as Coimbatore, Salem, Tirunelveli etc. while the same has been found to be lower for taluks of districts such as North Arcot, South Arcot where more stable agriculture is found. This fact leads us to believe that seasonal migrants who were found to be working in service sector, but were actually agricultural labourers might have been classified as working in other services in 1961. For this reason adjustment has been made to the data (ie) we have worked out the percentage point decline in other services between 1961 and 1971 and added it to the percentage of agricultural labourers. In other words we have assumed that the percentage of workforce in other services is the same for both 1961 and 1971 censuses. Though crude, this seems to be a better solution to the problem. After correction, from table 2, it has been observed that between 1961 and 1981, the percentage of workforce in non-agricultural occupation has gone up by 1.89 or approximately 2 percentage points.

At the district level (Table 3) it is observed that the percentage of workforce in non-agricultural employment varies between 14.83% in South Arcot and 50.37% in Kanyakumari district in the year 1961. In the year 1981, the same varies from 18.31% in South Arcot to 89.07%[1] in Nilgiris. Further comparison of

1. Since Nilgiris and Kanyakumari districts are found to have different settlement pattern and different cropping pattern these two districts are omitted from the analysis. And hence the taluks that belong to these districts are neither mapped nor the results of these taluks are discussed.

Table No.3
Percentage of Rural Male workers in Agriculture and Non-agriculture

Name of the District	1961 Uncorrected		1961 Corrected		1981	
	Agri-culture	Non-Agri-culture	Agri-culture	Non-Agri-culture	Agri-culture	Non-Agri culture
Chingleput	66.60	33.40	72.72	27.28	70.74	29.26
North Arcot	75.21	24.79	78.00	22.00	75.52	24.48
South Arcot	81.97	18.03	85.17	14.83	81.69	18.31
Salem	73.76	26.24	78.71	21.29	77.49	22.51
Coimbatore	57.96	42.04	68.16	31.84	69.10	30.90
Nilgiris	37.17	62.83	56.42	43.58	10.93	89.07
Madurai	71.42	28.58	79.28	20.72	77.34	22.66
Tiruchirapalli	77.77	22.23	80.85	19.15	79.23	20.77
Thanjavur	74.65	25.35	79.30	20.70	78.33	21.67
Ramanathapuram	76.90	23.10	80.17	19.83	74.92	25.08
Tirunelveli	62.04	37.96	67.13	32.87	67.95	32.05
Kanyakumari	38.56	61.44	49.63	50.37	59.88	40.12

the distribution of workforce between 1961 and 1981 reveals that the growth registered by non-farm sector is not the same across districts. Percentage point change varies from -1 in Coimbatore to 5.25 in Ramanathapuram. In general it can be observed that percentage point change in the level of non-agricultural employment is high for districts which had lower percentage of male workers in non-agricultural employment in 1961 and vice versa. For example, Ramanathapuram, South Arcot and North Arcot which had lower percentage of male workers in non-farm employment in 1961 have experienced 5.25, 3.28 and 2.48 percentage point change, which are higher than that witnessed at the state level, while districts such as Coimbatore and Tirunelveli which had higher percentage male workers in non-farm sector have experienced mild decline.

Distribution of Workforce At the Taluk level

In this section, we are discussing the distribution of taluks with regard to both degree of urbanisation and level of non-agricultural employment of rural male workers. To set the problem in the right perspective, taluks are grouped and mapped based on the level of non-agricultural employment and degree of urbanisation for the two census years 1961 and 1981 separately. For mapping, the taluks are grouped in to four groups such as taluks having (1) both higher level of rural non-agricultural employment and higher degree of urbanisation than that experienced at the state level (2) only higher level of non-agricultural employment (3) only higher degree of urbanisation

and (4) both low level of urbanisation and non-agricultural employment. Maps 1 and 2 indicate that there are three distinct clusters of taluks having higher level of non-agricultural employment (ie groups one and two). Of these three clusters one occurs in Ramnad and Tirunelveli not close to any urban centre of comparable size either to Coimbatore, Madurai or Salem. It is identified that majority of taluks that have higher level of non-agricultural employment have higher degree of urbanisation both in 1961 and 1981. Another interesting result seen from the mapping is that both Madurai, Tiruchirapalli have not exerted their influence on the level of non-agricultural employment of near by taluks. This result may be due to the differences in other factors that influence the growth of non-agricultural employment or due to differences in type of urbanisation and economy of these urban centres.

Another interesting phenomenon noticed by comparing the two maps is that, most of the coastal taluks have experienced higher change in degree of urbanisation. Out of 18 taluks (excepting the ones closer to Madras) in the sea coast, 5 taluks have both higher level of non-agricultural employment and higher degree of urbanisation, 1 has only higher level of non-agricultural employment, 4 have both low levels of non-agricultural employment and urbanisation, while majority of the taluks (i.e.) 8 taluks have higher degree of urbanisation in 1981. Of these 8 taluks, 3 had both low levels of urbanisation and non-agricultural employment in 1961, while one had high level of non-agricultural employment and low level of urbanisation in 1961. The result

indicates the possibility of different growth pattern in rural non-agricultural employment in the coastal taluks. It may be that a faster growth in rural non-agricultural employment of villages proximate to urban centre's of coastal taluks results in classification of that villages into urban centres over time.

Taluks have been grouped into five categories such as that have experienced (1) more than 5 percentage point positive (2) more than 2 but less than 5 percentage point positive (3) less than 2 percentage point positive (4) less than 1 percentage point negative (5) more than 1 percentage point negative change in rural non-agricultural employment, for mapping. From map 3 it has been identified that taluks that form groups 1 and 2 (ie) taluks that have experienced high or medium growth in non-agricultural employment are in four distinct clusters. Majority of these taluks have lower level of non-agricultural employment in 1961 and 1981. These, in other words indicate that taluks that had lower levels of non-agricultural employment in 1961 have experienced higher percentage point positive change in non-agricultural employment, but the level remains lower than that of the state in 1981.

Thus from the discussion on distribution and changes in distribution of workforce between agriculture and non-agriculture it emerges that there is large variation both in the level of non-agricultural employment and changes in the level of non-agricultural employment across districts and across taluks. For analysing the variation, in the level and changes in the level of non-agricultural employment the following hypotheses are

formulated and tested: (1) Degree of urbanisation of a taluk has positive impact on the level of non-agricultural employment of rural male workers. (2) Changes in the degree of urbanisation has positive impact, while the level of non-agricultural employment in the base year has negative impact on changes in the level of non-agricultural employment between 1961 and 1981 across taluks. (3) Proximity of taluks to urban centres of large size affect the level of non-agricultural employment in the rural area. (4) Level of income, degree of commercialisation and rate of unemployment in the rural area have positive impact on level of non-agricultural employment in the rural area, while distribution of income has negative impact. Given these hypotheses the impact of external factors on rural non-agricultural employment is analysed first.

Proximity and Level of Rural Non-agricultural Employment

In order to analyse the impact of proximity of taluks to urban centres on the level of rural non-farm sector, only taluks proximate to urban centres with more than 5 lakh population are considered. From the following table, it can be seen that the impact of proximity to urban centres differ from centre to centre. Rural area of all taluks around Coimbatore had higher .pa

Table No.4
Level of Rural Non-Agricultural Employment in Taluks proximate to Urban centres 1961

City	No.of taluks that have higher level of Non-agricultural Employment	No.of taluks that have lower level of non-agricultural employment	Total number of proximate Taluks
Madras	3 (75.00)	1 (25.00)	4 (100.00)
Coimbatore	3 (100.00)	-	3 (100.00)
Salem	4 (66.67)	2 (33.33)	6 (100.00)
Madurai	-	5 (100.00)	5 (100.00)
Tiruchirapalli	-	5 (100.00)	5 (100.00)

(1) Level of non-agricultural employment rural male workers of proximate taluks compared to State level rural non-agricultural employment of male workers.

(2) Figures in brackets are percentages to row total.

rate of non-agricultural employment in 1961, while 75% and 66.67% of taluks near Madras and Salem had higher level of non-agricultural employment. Further, it can be seen from the table that none of the taluks near Tiruchirapalli and Madurai reflect the impact of proximity. This result implies that the economy of Tiruchirapalli and Madurai is not strong enough to spread its impact to the rural areas of nearby taluks. Percentage point change in rural non-agricultural employment in these taluks suggest that only 43.47% of taluks have experienced higher increase in rural non-farm workforce than that experienced at the state level but this percentage varies across urban centres as

revealed by Table 5.

Table No.5
Changes in the Level of Non-agricultural Employment of Rural Male workers in Proximate Taluks between 1961-1981

City	No. of Taluks with higher than the change at the State level	No. of Taluks with lower than the change at the State level but positive	No. of Taluks with Negative change	Total No. taluks
Madras	3 (75.00)	1 (25.00)	-	4 (100.00)
Coimbatore	1 (33.33)	1 (33.33)	1 (33.33)	3 (33.33)
Salem	3 (50.00)	1 (16.67)	2 (33.33)	6 (100.00)
Madurai	2 (40.00)	2 (40.00)	1 (20.00)	5 (100.00)
Tiruchirapalli	1 (20.00)	3 (60.00)	1 (20.00)	5 (100.00)

seventy five percent of taluks near Madras, 50% of taluks near Salem, 40% of taluks near Madurai, 33.33% of taluks near Coimbatore and 20% taluks near Tiruchirapalli have experienced higher percentage point change in non-agriccultural employment compared to the change in percentage points at the state level. It has to be borne in mind that all taluks around Coimbatore have higher level of non-agricultural employment compared to that of the state both in 1961 and 1981. In other words the taluks around Coimbatore might have reached saturation with regard to the growth of non-farm sector in the rural area. Of the four

taluks identified to be close to Madras two taluks, namely Saidapet and Sriperumpudur have grown into an urban centre by themselves. The other two taluks, Ponneri and Tiruvallur have experienced higher growth in the non-farm sector in the rural area. This result indicates that if the rural hinterland is very close to the urban centre and if the urban economy is very strong in spreading its impact on the economy of these rural areas, then the rural areas themselves become part of the urban centre. In other words as the non-farm sector grows much faster due to the influence of the urban economy, the rural area develops into urban unit. This can be seen from the fact that nearly 40 panchayats around Madras (ie village panchayats of Saidapet and Sriperumpudur) have become urban or towns between 1961 and 1971. Around 18 new towns near Salem and 31 new towns near Coimbatore have come up between 1961 and 1971. Between 1971 and 1981, four village panchayats around Madras and 4 panchayats around Tiruchirapalli, have become urban centres or towns. This result indicates the possibility of an urban centre influencing the expansion of non farm sector in the adjacent rural areas which eventually become urban centres. Thus it lends support to the notion that proximity to urban centres does lead to expansion of rural non-farm sector. This phenomenon however has to be studied in detail as it will enable us to understand the process of expansion of rural non-farm sector and the process of growth of urban agglomeration.

Another important aspect of proximity is the growth of semi-

urban centres in taluks closer to well developed urban centres. The growth of semi-urban centres is related to the extent of transportation facilities available between the urban centre and the rural hinterlands of the adjacent taluks. If all rural areas are properly linked to the urban centre, then the non-farm sector in the rural areas will consistently expand. While if a particular rural area alone is linked, that area will attract the rural artisans and manufacturers leading to the growth of that particular rural area to become a semi-urban centre. For example, except Sankari, all taluks near Salem have experienced higher percentage point change in rural non-farm employment while of the five taluks closer to Madurai 3 have experienced higher growth in degree of urbanisation than in the expansion of non-farm sector. From this result we suspect that the extent of growth of transport induces different pattern of growth in non-farm sector between taluks which affects both the rate of non-agricultural employment and type and extent of urbanisation, which needs to be carefully examined.

Rural Non-farm Employment and External Factors:

As stated in the introduction, non-farm employment in the rural hinterland is affected by the presence of urban centre in two ways (1) through the demand for manufactured goods of rural origin and (2) through the demand for services (ie) urbanisation has (1) spread effect[1] and (2) pull or push effect. It is not

1. By spread effect, we refer to the impact of urbanisation on rural non-farm sector through the raise in demand for goods of rural manufacturing and household industries and the impact due to growth of auxiliary industries in the rural area that support the main industries in the urban area.

possible to disentangle the impact of urbanisation into the different components with the available data. Hence the total impact of urbanisation is analysed. It is hypothesised that rural non-agricultural employment of a taluk depends on the degree of urbanisation of the taluk. Correlation co-efficients between degree of urbansiation (defined as percentage of population in urban area to total population of each taluk) and rate of non-agricultural (non-farm employment) employment of male workers (defined as percentage of male workers in non-agricultural employment to total male workers in the rural area of each taluk) have been worked out. Correlation co-efficients worked out for the two census years 1961 and 1981 considered are 0.49 and 0.47 respectively. Both co-efficients are found to be statistically significant at 5% level, indicating that the association between degree of urbanisation and level of non-agri cultural employment is positive. In other words as we move from less urbanised to more urbanised taluks, the rate of non-agricultural employment of male workers in rural areas also goes up. Taluks that belong to Kanyakumari and Nilgiris districts are found to be outliers as they have different settlement pattern and are left out from the analysis. Correlation co-efficents reestimated after deleting the taluks of these two districts turned out to be 0.47 and 0.54 respectively for 1961 and 1981 (both statistically significant). While the co-efficient for 1961 is found to be lower, and the same for 1981 has improved considerably.

Further scrutiny of data through scatter plot revealed the

presence of few more outliers such as Yercaud, Shencottah and Kodaikanal. These taluks too have different settlement patterns from the rest of the taluks of the state. Hence they are omitted from the analysis. Correlation co-efficients obtained after eliminating all outliers[1] are 0.57 for 1961 and 0.65 for 1981 and are found to be significant at 5% level. Apart from indicating a significant positive association between degree of urbanisation and rural non-agricultural employment of male workers these co-efficients also suggest that the association has become stronger in 1981 compared to 1961.

To estimate the elasticity of non-agricultural employment with reference to degree of urbanisation the following function has been fitted separately for 1961 and 1981.

$$\log (Y) = a + b \log (X) + Ut$$

where Y is percentage of rural male workers in non-agricultural occupation to total rural male workers in each taluk, X is percentage of population in urban areas of each taluk, Ut is random error term, a is constant (intercept) and b is elasticity. This particular functional form has been selected as it directltly yields the elasticity. The estimated equations for the years 1961 and 1981 are

1961: $$\log (Y) = 2.150 + 0.335 \log (x) + e_{t1}$$

$$(0.145) \quad (0.050)$$

$$R^2 = 0.335 \qquad F = 44.913$$

---

1. Henceforth all the outliers have been omitted from the analysis.

1981: $$\log(Y) = 2.330 + 0.291 \log(x) + et$$
$$(0.122)\ (0.040)$$
$$R^2 = 0.373 \quad F = 52.902$$

The 'F' statistics of the estimated functions suggest that the estimated relationships are significant at 5% level both for 1961 and 1981. The urbanisation elasticities of non-agricultural employment of rural male workers are 0.335 and 0.291 respectively for the years 1961 and 1981, which are found to be significantly different from zero at 5% level. These elasticities indicate that a percentage point change in degree of urbanisation leads to 0.335 and 0.291 percentage point change in rural non-agricultural employment of male workers across taluks respectively in the years 1961 and 1981. Thus the result indicate that the hypothesis that degree of urbanisation of a taluk has positive impact on the level of non-agricultural employment of male workers is true.

Changes in the Level of Non-agricultural Employment:

In order to find out the impact of change in the degree of urbanisation on the change in level of non-agricultural employment, the following function has been fitted.

$$Y = a + b_1 X_1 + b_2 X_2 + b_2 X_3 + Ut$$

where Y is percentage point change in the rate of non-agricultural employment of rural male workers between 1961 and 1981, X_1 percentage point change in degree of urbanisation between 1961 and 1981 of each taluk, X_2 is base year degree of

---

1. Figures in parantheses are standard errors of the estimates.

urbanisation of each taluk, X_3 base year level of non-agricultural employment of rural male workers, a is intercept, b_1 b_2 and b_3 are slope co-efficients or parameters to be estimated and at Ut is random error term. Base year degree of urbanisation has been introduced into the equation, for capturing the impact of higher level of urbanisation in the base year. We expect that higher level of base year urbanisation to have greater push effect on the rural non-agricultural sector. In otherwords, the problem of congestion and resultant bad living condition in urban area is expected to be related to the degree of urbanisation in the base year. Thus, higher the degree of urbanisation in the base year, higher will be the push effect. Further we expect that the growth of non-agricultural employment will not be same throughout, the rate at which it increases will be lower after a certain point, which depends on the capacity of the rural non-agricultural sector. Hence we expect that higher level of non-agricultural employment to have negative (ie) lesser impact on the change in the level of non-agricultural employment.

Estimated relationship turned out to be

$$Y = 4.478 + 0.075X_1 + 0.067\,X_2 - 0.178\,X_3 + et$$

(1.022) (0.052) (0.029)[1] (0.052)

$R^2 = 0.119$ $F = 4.05$

'F' value suggests that R^2 is significantly different from zero at 5% level, slope co-efficients b_2 and b_3 are found to be statistically significant. While b_1 (the co-efficient of changes in degree of urbanisation) turned out[1] to be not significantly

1. Figures in parantheses are standard errors.

different from zero. This result implies that both base year level of urbanisation and change in the level of urbanisation have positive impact on percentage point change in the level of rural non-agricultural employment of rural male workers, but the impact of change in the level of urbanisation is not significant. Further as anticipated the level of non-agricultural employment in the base year has negative influence on the change in the level of non-agricultural employment between 1961 and 1971. In otherwords higher the base year rate of non-agricultural employment, the change in the rate of non-agricultural employment tends to be lower. On the other hand taluks where the urbanisation is relatively higher to begin with have experienced a large rise in the rate of rural non-agricultural employment.

The taluks have been grouped into three according to their degree of urbanisation in the base year 1961 as taluks with (1) <15% urban population (2) >15 but less than 20% urban population and (3) >20% urban population. This grouping has been adopted based on the examination scatter plot, which revealed three distinct clusters of taluks. This grouping of taluks will help studying the difference in the impact of change in degree of urbanisation across groups. Growth of urban centres in poorly urbanised taluks may be at the cost of growth of non-agricultural employment in the rural areas, as the pull factor of urbanisation is expected to be at work in the initial stages of urban growth. In other words growth of urbanisation in taluks where base year urbanisation is low in the base year, may have negative impact on the change in the rate of non-agricultural employment. On the

other hand in taluks where degree of urbanisation is higher, both the change in degree of urbanisation and degree of urbanisation in the base year expected to have positive impact on the change in the rate of rural non-agricultural employment. This result is anticipated as in the latter type of taluks the push factor is expected to work. Further, it is expected as extent of transportation facility available to be related to degree of urbanisation of a taluk. Availability of easy transportation will help the workers to stay in the rural areas and work in the urban centres of the taluk. The function described earlier has been estimated separately for each of the three groups to test the hypothesis suggested above.

The results of the estimated functions are

(1) $$Y = 4.832 - 0.183X_1 + 0.174X_2 - 0.229X_3 + e_t$$

(1.452) (0.106)[1] (0.131) (0.076)

$R^2 = 0.269$ $F = 4.421$

(2) $$Y = 8.040 + 0.138X_1 - 0.272X_2 - 0.064X_3 + e_t$$

(10.602) (0.117) (0.617) (0.177)

$R^2 = 0.030$ $F = 0.134$

(3) $$Y = 6.509 + 0.192X_1 + 0.037X_2 - 0.228X_3 + e_t$$

(2.278) (0.080) (0.047) (0.081)

$R^2 = 0.223$ $F = 3.163$

The estimated relationships are significant at 5% level for the first and third group, while for the second group the

---

1. Figures in parantheses are standard errors.

relationship turned out to be in insignificant at the same level. It can be seen from the results that the co-efficient for change in urbanisation in the taluks with low urbanisation in the base year is negative and significant at 5% level. This result coincides with our expectation, that in poorly urbanised taluks the pull factor of urbanisation is expected to have a negative impact on the rural non-agricultural employment of the taluk.

The regression for the second group of taluks is found to be not significant as those taluks which are closer to taluks of first group in terms of degree of urbanisation might have the features of taluks of the first group, while the rest of the taluks will have the features of third group. Hence there may not be a consistent growth pattern of urbanisation and rural non-agricultural employment within this group.

As pointed out earlier, the equation for the third group of taluks is significant and the co-efficient for change in degree of urbanisaation has been found to significant at 5% level, while the co-efficient for base year degree of urbanisation has been found to be positive but not significant. This result could be interpreted to indicate that for the third group of taluks the push effect of urbanisation has the impact on rural non-agricultural employment of these taluks. The results suggest further that irrespective of groups base year level of non-agricultural employment has negative impact across taluks on the change in the rate of non-agricultural employment in the rural areas.

It is felt that the problem is more complex as the degree of urbanisation and rate non-farm employment in the base year varies to a greater extent, accross taluks. As it is pointed out that higher degree of urbanisation and higher level of non-agricultural employment in the base year to have lesser impact on the growth of urbanisation and the rate of growth of non-agricultural employment of respective taluks. So we intend giving weight to the level of non-agricultural employment and degree of urbanisaion in the base year to the change in the level of non-agricultural employment and degree of urbanisation. Hence the function has been modified and the modified function turned out to be

$$Y = a + b_1 X_1 + b_2 X_2 + b_3 X_3 + Ut$$

where Y is the ratio of percentage of male workers in non-agricultural employment in the rural areas in 1981 to the percentage of rural male workers in non-farm sector in 1961, X_1 is the ratio of degree of urbanisation in 1981 to the base year degree of urbanisation, X_2 base year degree of urbanisation, X_3 is base year level of non-farm employment, Ut is random error terms, a is intercept and b_1 to b_3 are slope co-efficients of the respective variables.

The fitted relationship turned out to be

$$Y = 130.767 + 0.004\, x_1 + 0.357 - 1.178\, x_3 + et$$
$$(0.036) \qquad (0.128) \quad (0.223)$$

$$R^2 = 0.242 \qquad F = 9.554$$

Results of the fitted relationship indicate that co-efficients of only base year urbanisation and base year level of non-

agricultural employment are found to be statistically significant at 5% level. Co-efficient of base year urbanisation suggests that percentage point change in the base year degree of urbanisation leads to 0.36 percentage point change in the ratio of levels of non-agricultural employment between 1981 and 1961 in the rural areas across taluks. The co-efficient of base year level of non-agricultural employment suggests that a percentage point change in base year level of non-agricultural employment across taluks leads to 1.18 percentage point change in the ratio of levels of non-agricultural employment between 1961 and 1981. The results are not significantly different from the results obtained by fitting earlier functions to warrant indepth analysis based on this functional form.

To sum up, the results of the analysis at taluk level indicate that there is positive relationship between degree of urbanisation and level of non-agricultural employment across taluks. Changes in level of non-agricultural employment is positively related to changes in degree of urbanisation in taluks where base year urbanisation is higher, while the relationship is negative in taluks where the urbanisation in the base year is low. In other words, in taluks where low urbanisation has been found in the base year, pull factor of urbanisation affects the changes in the level of non-agricultural employment while push factor affects the changes in level of non-agricultural employment in the highly urbanised taluks. Analysis of proximity to urban centres indicate that the impact of proximity on the

level of non-agricultural employment in the rural areas of taluks closer to them. It points out that the economy of the urban centre and the process of growth of these urban centres are important in determining the growth of non-agricultural employment in the rural areas of adjacent taluks with the type and extent of growth of transportation. Further this analysis indicates that disaggregated analysis controlling for the effect of proximity, growth and extent of transportation facilities, size of taluks is essential for a thorough understanding of the impact of urbanisation on rural non-agricultural employment in the rural areas of different taluks.

As indicated at the outset, so far we have considered only factors that are outside the rural economy that cause changes in the level of rural non-agricultural employment of male workers across taluks and between two points of time across taluks are considered in the analysis. Factors that affect the level of non-agricultural employment from within the rural economy such as extent of commercialisation and level of income etc are not considered. In the following section, an analysis of factors - both internal and external - underlying the variation in level of non-agricultural employment in the rural areas across districts and across taluks is attempted.

Impact of Internal and External Factors on Rural Non-farm Employment

District Level Analysis:

In this section both factors external and internal to the rural economy that affects the growth of non-farm employment are

considered. At the outset, it is pointed out that data on rate of unemployment of rural male workers and the distribution of income in the rural area are not available. Hence only the effect of urbanisation commercialisation of agriculture and level of agricultural income on non-farm employment is analysed. Degree of urbanisation as mentioned earlier is introduced into the equation to capture the total impact of urbanisation on non-farm sector, while Gini ratio, value of output per rural population and proportion of commercial crop output to total output of all crops have been introduced in the equation to capture the impact of increase in level of income and commercialisation.[1] As time series data are not available this analysis is restricted to a single year (1981) across districts and across taluks. At first the analysis is carried out at the district level.

---

1. Vaidyanathan (1986) has analysed the variation in the level of non-agricultural employment across states in relation to crop output per head, concentration ratio of operational holding proportion of cropped area devoted to non-food crops and the rate of unemployment in the rural area. His pioneering analysis of non-farm employment has proved that the residual sector hypothesis holds good at the state level. In otherwords his analysis renders evidence to the fact that non-agricultural sector that absorbs labour force which cannot find gainful employment in the agricultural sector. Further his analysis has pointed out that crop output per head of rural population has positive impact, concentration ratio of operational holding has negative impact. The latter result leads us to suspect for the type of bias that would have arisen out of aggregation. We suspect the latter result as Gini ratio has been used a partial measure of commercialisation, which is expected to have positive impact on rate of non-agricultural employment. Further his results with regard to proportion of area devoted to non-food crops on non-farm employment is inconclusive. His work is particularly interesting as it establishes the relation ship between non-farm employment and factors internal to the rural economy.

At the district level, we have fitted the function of the following form

$Y = a + b_1 x_1 + b_2 x_2 + b_3 x_3 + b_4 x_4$ + Ut Where Y is the percentage of rural male workers in nonfarm employment, X_1 is degree of urbanisation as defined earlier, X_2 is output percapita (i.e. output per head of rural population), X_3 is proportion of commercial crops output (nonfoodgrain crops output to total crop output) to total output of all crops. We have included only 11[1] districts for which inequality measure is readily available.

Output percapita has been introduced in the equation as a measure of level of income, which is expected to have positive impact. Given other things increase in output per head may be the result of higher utilisation of purchased inputs, which will increase the demand for services to deliver them at the farm gate. Further the increased output has to be efficiently marketed which will result in increase nonfarm activities in the rural area. Proportion of nonfoodgrain crops output to total output of crops and concentration ratio of land holdings are used as partial measures of commercialisation.

Examination of the scatter reveals that there exists no systematic relationship between dependent variable and the independent variables at the district level except between urbanisation and the rate of nonfarm employment. Hence instead of estimating the hypothesised relationship in totality, we adopted stepwise regression technique which controls for the

---

1. Mitra A. and Mukerji, S (1980).

presence of the independent variables, depending on the significance of the explanatory power of each one of them, in the equation. In this procedure it has been found that only urbanisation has entered the equation. Thus the estimated relationship turned out to be

$$Y = 13.78 + 1.47X_1 + e_t$$
$$(14.195) \quad (0.447)$$
$$R^2 = 0.544 \qquad F = 10.765$$

This result indicates that urbanisation alone explains around 54% of the variation in non-farm employment across districts. At the second stage we incorporated average output per head of rural population for the years 1978-79 to 1980-81, as we thought that the output of any single year may reflect the peculiarities of that year, but the result has not improved. Hence the details of the analysis and the results are not produced here.

As stated earlier, Kanyakumari is an outlier, hence we omitted this observation and fitted the function. The estimated relationship turned out to be

$$Y = 12.360 + 0.438x_1 + et$$
$$(3.410) \qquad (0.116)$$
$$R^2 = 0.642 \qquad F \quad 14.346$$

It is interesting to note that the fit of the function has improved considerably as indicated by the R^2's and the 'F' values of the functions. R^2 has improved from 0.54 to 0.64 while the 'F' static has gone up to 14.34 from 10.76. Slope co-efficient of the second function is far below then that obtained from the

earlier function (ie with Kanyakumari included). Thus the result indicates that the inclusion of extremes leads to bias in the estimates obtained and also leads to inefficiency of the estimates. This problem is greater when the number of observations are smaller. From the result that we have obtained it is not possible to infer much on the relationship between the variables considered and rural non-agricultural employment of rural male workers. Further, we believe that suppression of within district variation might pose considerable problem. Hence we analyse the variation in non-agricultural employment at the taluk level.

Taluk level Analysis:

As mentioned earlier, the results obtained at the district level do not provide conclusive evidence on the hypothesised relationship. The insignificant results may be due to aggregation and the resultant bias and suppression of intra-district variation in the data. Hence to improve our understanding of the relationship between the internal and external factors responsible for variation in non-agricultural employment. The following function has been fitted at the taluk level.

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + Ut$$

Where X_1 is the degree of urbanisation, X_2 is the percapita gross cropped area of rural population, X_3 is the proportion of irrigated area to total cropped area, X_4 is the concentration ratio of operational holdings (indexed by multiplying with 100,

so as to make the interpretation easier), X_5 is the percentage of area irrigated by wells to total irrigated area, Ut, is random error term, a is intercept b_1 to b_6 are slope co-efficients and Y is the percentage of male workers in non-agricultural employment.

It has to be noted that percapita gross cropped area and proportion of gross cropped area irrigated as proxies for output per head of rural population. We have used these two variables as percapita output is determined by percapita gross cropped area and area irrigated (i.e.) output percapita is a function of gross cropped area percapita and proportion of area gross cropped area irrigated. Proportion of cropped area irrigated by wells to total cropped area irrigated is used as a partial measures of commercialisation. Well irrigation requires purchased inputs and also provides assumed irrigation. Assured irrigation leads to better utilisation of inputs such as fertilizers and pesticides. Hence this variable is used as a partial measures of commercialisation. Other variable namely concentration ratio is as defined earlier.

We have adopted stepwise regression technique and identified that the variables used as proxies for output percapita of rural population do not bear significant impact on rural non-farm employment. Thus the estimated relationship turned out to be

$$Y = -8.287 + .286X_1 + 0.436X_4 + 0.081X_5 + e_t$$

$$(6.851) \quad (0.03) \quad (0.122) \quad (0.019)$$

$$R^2 = 0.527 \qquad F = 44.638$$

Estimated relationship and the slope co-efficients of the

included variables are found to be significant at 5% level. All the included variables have expected signs. Given other things, one percent change in urbanisation leads to 0.286% positive change in the non-farm employment of rural male workers and a percentage point change in well irrigation leads to .08% point change in non-farm employment across taluks.

The insignificant result obtained for the variables representing percapita output (level of income) may be either they are not good proxies of percapita output of rural population or level of income in itself may not be an adequate measure to capture the impact of the income effect on non-farm employment. This argument is based on the reason that the income generated in the non-farm sector is also spent in the rural area, hence the total rural income and the increase in the total rural income rather than output per head may be an adequate measure. Distribution of rural income rather than the level of rural income may have a telling impact on the rural non-farm sector. Further if output per head is taken as a measure of capturing the impact of increase in commercialisation as result increase in marketed surplus, then its impact will be largely on trade and commerce and transport and storage industries than on total non-farm employment. In this analysis as all industrial classifications are grouped together, particularly the other services, output percapita may not reflect the impact of commercialisation alone, but also the impact of poor agriculture and the resultant push effect of agricultural sector on non-farm sector. In otherwords, the other services which act as residual category

that absorb the labour force that cannot find gainful employment in agriculture may be inversely related to agricultural output, while other classifications may be directly related. Thus there exists the possibility of both high and low agricultural output being related to high rate of non-farm employment, as non-farm employment is considered in totality.

Rural Literacy and Non-farm Employment

In the course of our analysis, it has been found out that rate of literacy is positively associated with non-farm employment in the rural area. Correlation co-efficients between rate of literacy of rural males (defined as percentage of rural literate males to total rural males) and level of rural non-farm employment of male workers in the rural areas works out to 0.34 and 0.485 respectively at the district and taluk levels. Correlation co-efficient obtained at the district level has been found to be not significantly different from zero both at 1% and at 5% levels of significance, while the co-efficient has been found to be statistically significant at 1% level at the taluk level. It has not been possible to unearth the causes of this observed positive association between level of rural non-farm employment and rate of literacy. We wanted to find out if literacy explains significant proportion of the variation in the non-farm employment across taluks. Hence we have included rate of literacy as an independent variable in the equation and the new equation turned to be

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + Ut$$

Where X_1 to X_5 are as defined earlier and X_6 is the rate of

literacy of rural males.

Stepwise regression technique has been adopted to estimate the relationship. It has been identified that literacy is the second important variable in the function while urbanisation is the most important variable. Literacy explains 5% of the total variation in non-farm employment across taluks and is significant at 1% level. The results with regard to other variables are not affected by the inclusion of rate literacy in the function to warrant any caution. Thus the ultimate result of the function turned out to be

$$Y = -14.05 + 0.238X_1 + 0.285X_6 + 0.089X_5 + 0.286X_4 + et$$

(6.720) (0.031) (0.079) (0.018) (0.123)

$R^2 = 0.574$ $\quad F = 40.14$

Variables used to capture the level of income such as area per head of rural population and proportion of area irrigated to total cropped area have not entered the equation as they do not have significant impact on rate of rural non-farm employment.

Conclusion:

From our analysis it is inferred that degree of urbanisation, commercialisation of agriculture and rate of literacy of male workers have significant positive impact on the level of non-farm employment of rural male workers. We would like to pursue the work at more disaggregated level, both spatially and industrial classification wise, to unearth the impact of agricultural income(level) and rate of literacy. Further we are interested in identifying the impact of proximity

to urban area through disaggregated analysis, as it is not possible to arrive at any definite conclusion on the degree of influence of proximity to urban centres. Another set of issues that merit attention is the impact of urbanisation on rural wages and rural non-farm employment and hence on reducing poverty in the rural area. Also, the impact of growth of agricultural income on non-farm employment and hence on rural poverty has to be analysed.

APPENDIX

Data: Data on distribution of workforce have been taken from census volumes 1961, 1971 and 1981. It has been found out that definition of workers and criteria of classification of workers have changed between censuses. It is felt that the change in definition of workers may have changed between censuses. It is felt that the change in definition of workers may have greater impact on female work participation rate than on male work participation rate, hence only the distribution of male workers are analysed. Further we restrict ourselves to relative growth of agricultural and non-agricultural sectors, due to the definitional problems as estimation of absolute growth of work force in different sectors will be misleading. It is not possible to analyse in detail, the distribution of workforce in different industries as presentation and classification of workers are different for different censuses. For example, those industrial establishments that satisfy the criteria of household industries and belong to industrial division 0 through 3 are classified as household industries in 1961, while only those establishments that belong to industrial division 3 are declared as household industries[1] in 1971 and 1981. Apart from this, the presentation also differs between censuses. Workforce distribution under all 9 industrial classifications are provided in 1961 and 1971, while 1981 censuses adopts only 4 broad classification of workers. Hence our analysis is restricted to only the broad two categories of workers. First category namely

---

1.See Census of India, 1971.

agricultural workers refers to workforce engaged in agriculture either as cultivators or as agricultural labourers, while the second category namely non-agricultural workers refers to all those who do not come under the first category.

The variable crop output has been constructed using the data published in Season and Crop Reports of Tamilnadu for the years 1979, 1980 and 1981 for the different districts. Gini ratios for the various districts have been culled out from Mitra, A. and Mukerji,S. (1980), while the Gini ratios of operational holdings at the taluk level have been computed using data published by World Agricultural Census, 1971, as data for 1981 are not available. We have used the data published by World Agricultural Census 1971, on the assumption that the distribution of operational holdings have not changed much. Further it has to be pointed out that the number of taluks for which data have been published by World Agricultural Census 1971, do not tally with the number of taluks for which data have been published by Census 1981, as there were some new taluks created between 1971 and 1981. We have identified these divisions and merged them with the old ones so as to make sure that the taluks correspond to the taluks listed in World Agricutural Census. Taluks of Nilgiris and Kanyakumari districts are omitted from the analysis as they are found to be outliers.

Data on gross cropped area, gross cropped area irrigated and gross cropped area irrigated by wells for different taluks have been collected from various District Census Hand books of Tamilnadu.

REFERENCES

Mitra, A and Mukerji, S (1980) Population Food and Land Inequality in India 1971: A Geography of Hunger and Insecurity AN ICSSR/JNU/FPF Study, Allied Publishers Pvt Ltd.

Vaidyanathan, A. (1986) "Labour Use in Rural India: A study of Spatial and Temporal Variations" Economic and Political Weekly, Vol.XXI, No.52, Review of Agriculture, December 27.

Reports:

Census of India, 1961, Part II-A General Population Tables of Madras State.

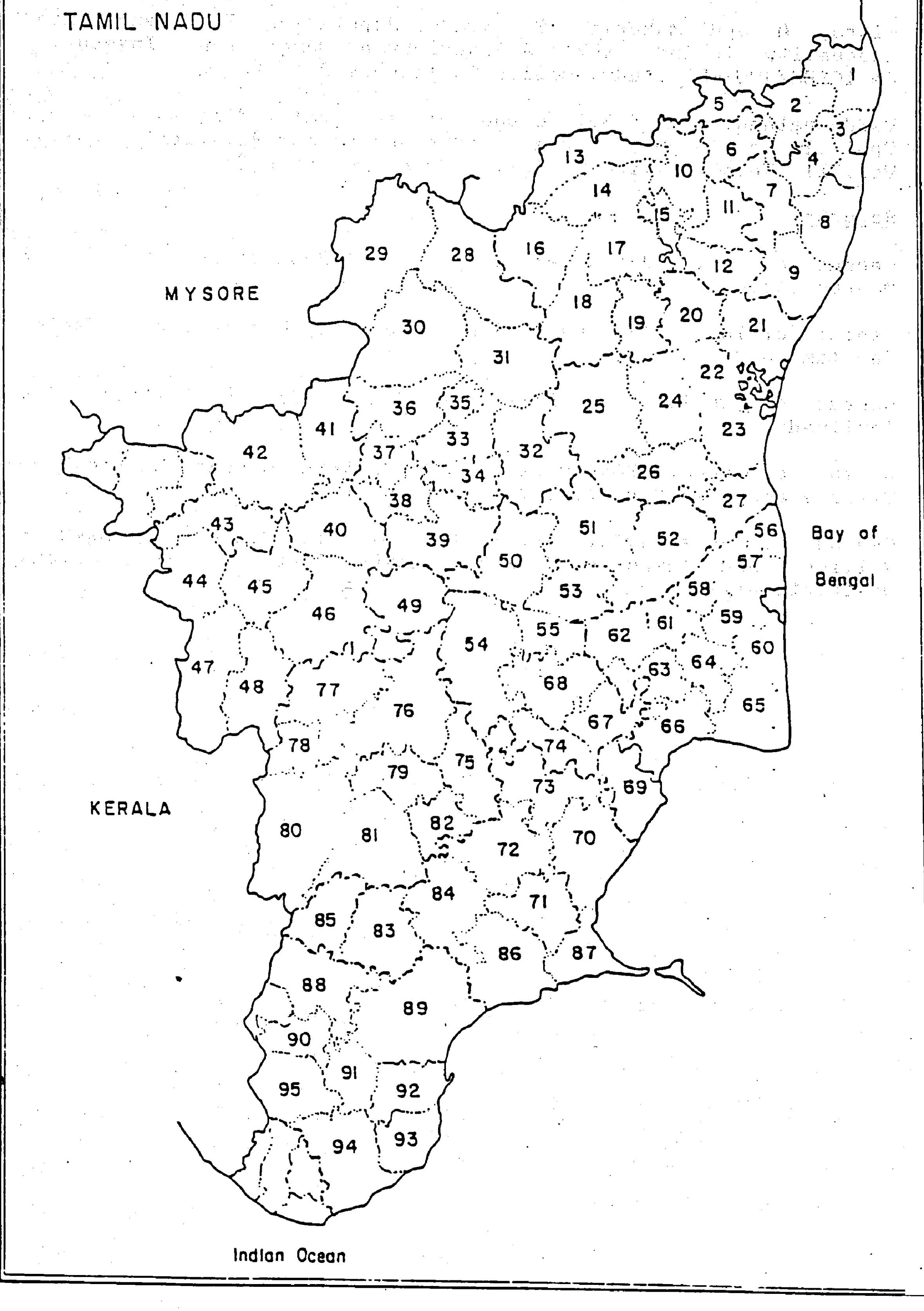
Census of India, 1971 Part II-A (i) General Population Tables for Tamilnadu.

Census of India, 1981, Part II-B Primary Census Abstract for Tamilnadu.

Census of India, 1981, Part XIII A District Census Handbook - Village and Town Directory for various Districts of Tamilnadu.

Census of India, 1981, Part XIII B District Census Handbook - Village and Townwise Primary Census Abstract for various Districts of Tamilnadu.

Map -1

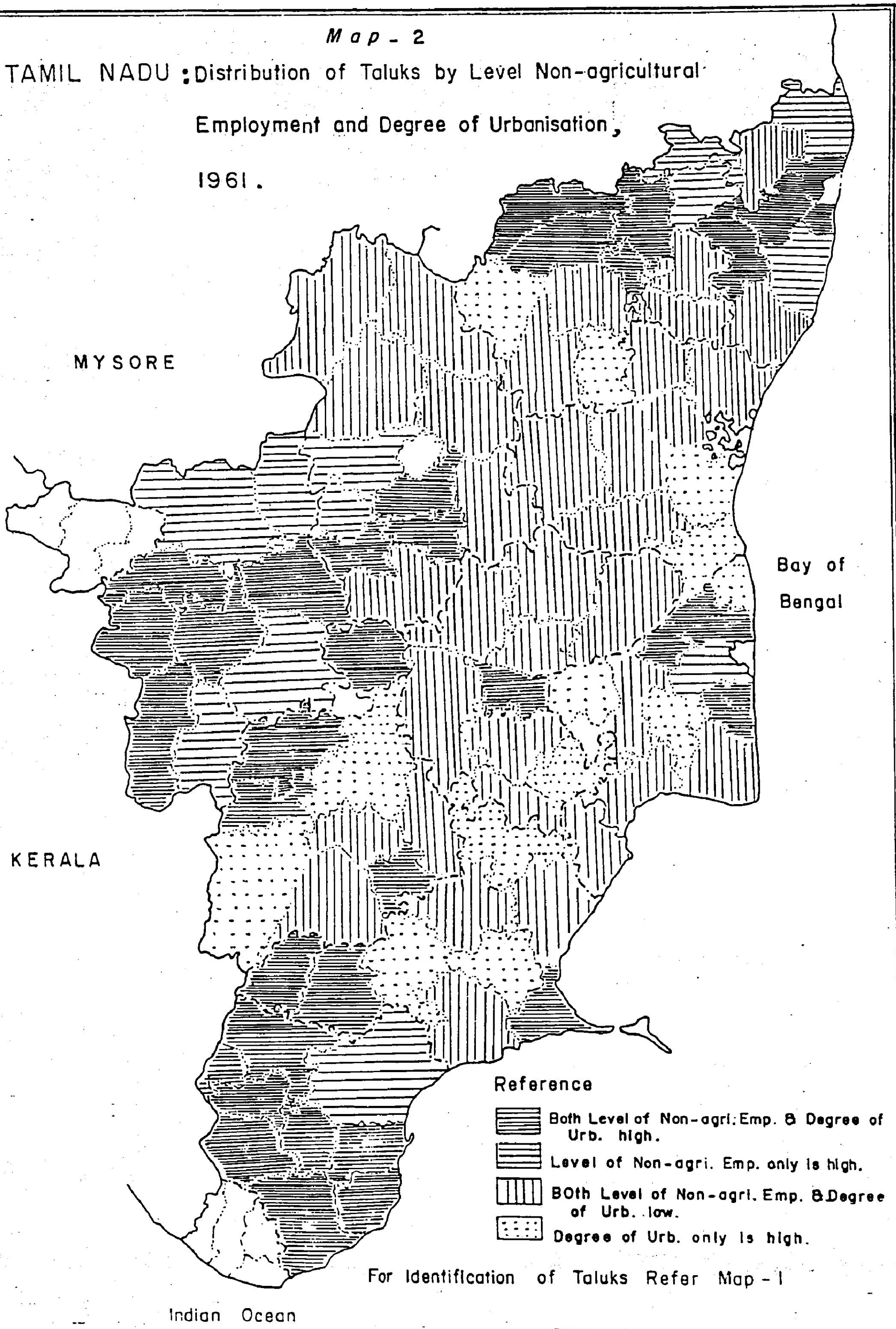

TAMIL NADU
MYSORE
KERALA
Bay of Bengal
Indian Ocean
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95

List of Taluks

1. Ponneri
2. Tiruvallur
3. Saidapet
4. Sriperumbudur
5. Tirutani
6. Arkonam
7. Kancheepuram
8. Chenglepet
9. Maduranthakam
10. Walajapet
11. Cheyyar
12. Wandiwash
13. Gudiyattam
14. Vellore
15. Arni
16. Tirupattur
17. Polur
18. Chengam
19. Tiruvannamalai
20. Gingee
21. Tindivanam
22. Villupuram
23. Cuddalore
24. Arcot
25. Kallakkurichi
26. Vriddhachalam
27. Chidambaram
28. Krishnagiri
29. Hosur
30. Dharmapuri
31. Harur
32. Attur
33. Salem
34. Rasipuram
35. Yercaud
36. Omalur
37. Sankari
38. Tiruchengode
39. Namakkal
40. Erode
41. Bhavani
42. Gopichettipalayam
43. Avinashi
44. Coimbatore
45. Palladam
46. Dharapuram
47. Pollachi
48. Udumalpet
49. Karur
50. Musiri
51. Perambalur
52. Udaiyarpalayam
53. Lalgudi
54. Kulittalai
55. Tiruchirappalli
56. Sirkali
57. Mayuram
58. Kumbakonam
59. Nannilam
60. Nagapattinam
61. Papanasam
62. Thanjavur
63. Orattanadu
64. Mannargudi
65. Tirutturaipundi
66. Pattukkottai
67. Alangudi
68. Kulattur
69. Arantangi
70. Tiruvadanai
71. Paramagudi
72. Sivaganga
73. Tiruppattur
74. Tirumayam
75. Melur
76. Dindigul
77. Palani
78. Kodaikanal
79. Nilakkottai
80. Periyakulam
81. Thirumangalam
82. Madurai
83. Aruppukkottai
84. Sattur
85. Srivilliputtur
86. Mudukulattur
87. Ramanathapuram
88. Sankarannayinarkoil
89. Kovilpatti
90. Tenkasi
91. Tirunelveli
92. Srivaikuntam
93. Tiruchendur
94. Nanguneri
95. Ambasamudram

Map - 2

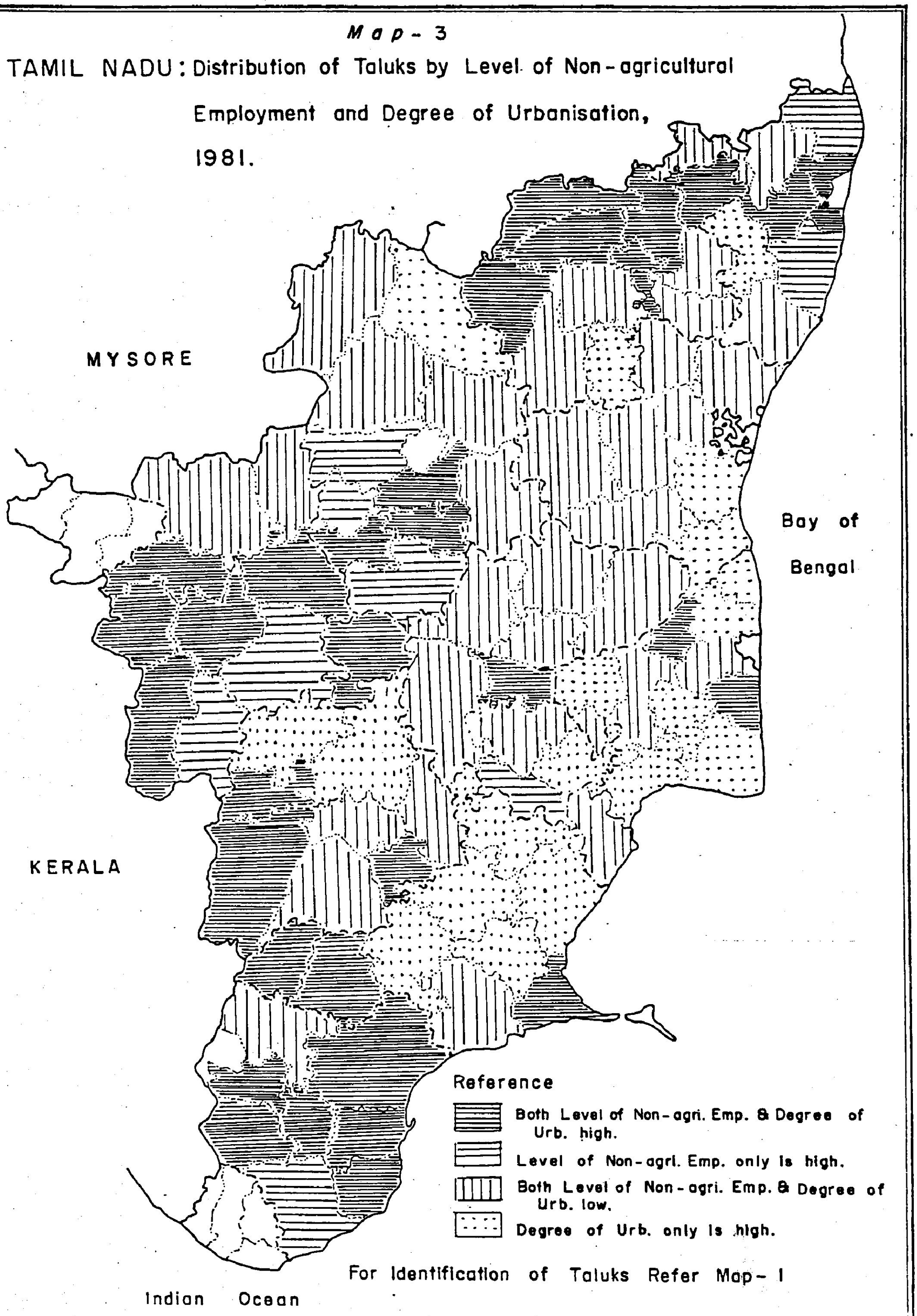
TAMIL NADU : Distribution of Taluks by Level Non-agricultural Employment and Degree of Urbanisation, 1961.



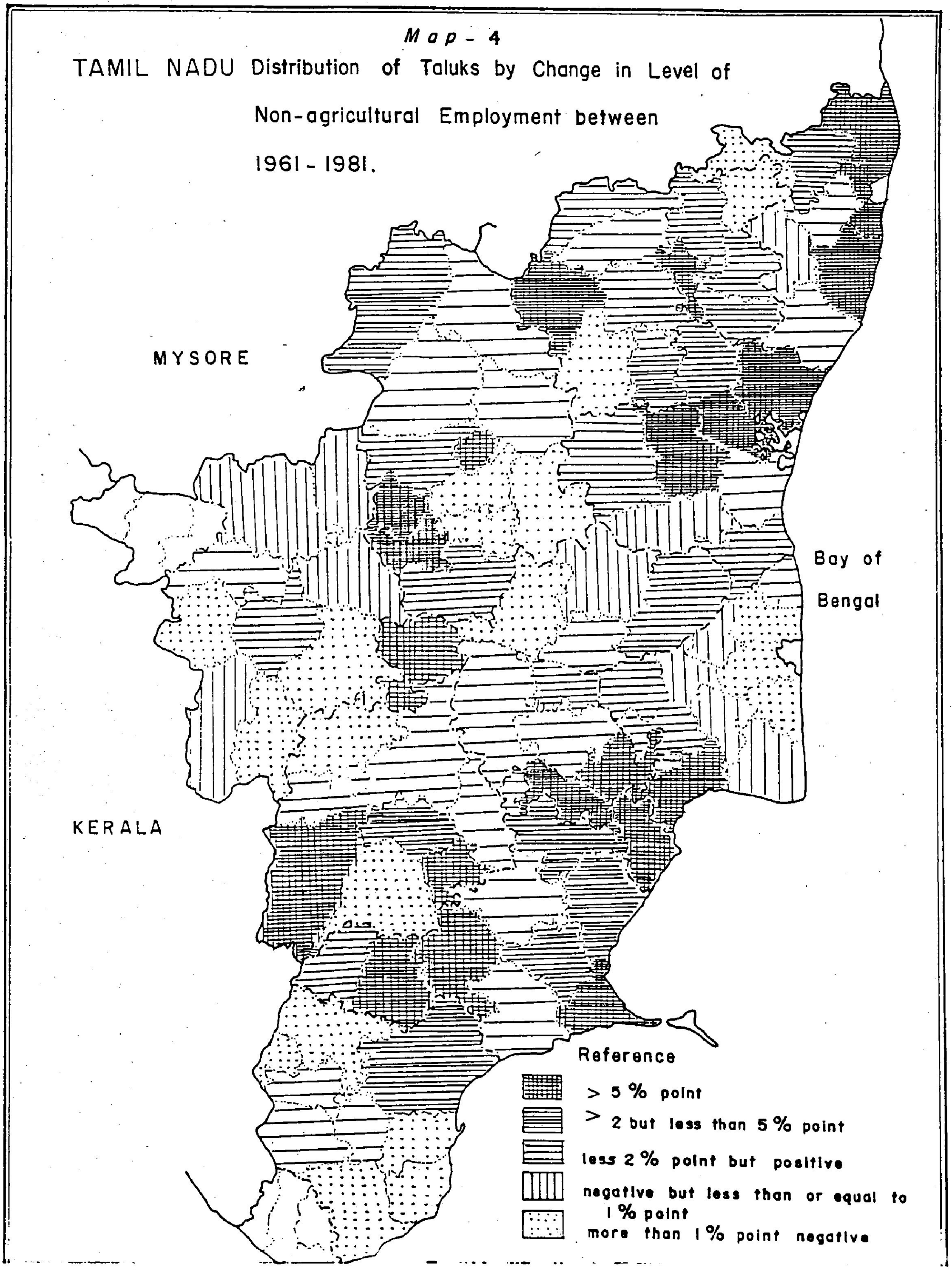
For Identification of Taluks Refer Map - I

Map - 3

TAMIL NADU: Distribution of Taluks by Level of Non-agricultural Employment and Degree of Urbanisation, 1981.



For Identification of Taluks Refer Map- I


Map - 4
TAMIL NADU Distribution of Taluks by Change in Level of
Non-agricultural Employment between
1961 - 1981.
MYSORE
KERALA
Bay of
Bengal
Reference
> 5 % point
> 2 but less than 5 % point
less 2 % point but positive
negative but less than or equal to
1 % point
more than 1 % point negative